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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/997,650      | 11/28/2001  | Julia C. Duncan      | DUNCAN 3-10-40      | 7404             |

27964 7590 05/12/2003

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EXAMINER

HOGANS, DAVID L

| ART UNIT | PAPER NUMBER |
|----------|--------------|
|----------|--------------|

2813

DATE MAILED: 05/12/2003

9

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/997,650

Applicant(s)

DUNCAN ET AL.

Examiner

David L. Hogans

Art Unit

2813

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 19 March 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 9-12 and 15-17 is/are pending in the application.
- 4a) Of the above claim(s) 1-8, 13, 14 and 18-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 9-12 and 15-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

This Office Action is in response to Amendment B filed on March 19, 2003.

#### ***Status of Claims***

Claims 9-12 and 15-17 are pending. Claims 1-8, 13, 14 and 18-20 have been cancelled.

#### ***Withdraw of Finality***

The finality of the Office Action mailed on February 11, 2003, has been withdrawn.

#### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 9, 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over 6,195,191 to Osenbach et al. in view of 6,200,826 to Kim.

#### **Claim 9**

Osenbach et al. teaches forming a semiconductor substrate made of lithium (See column 7 lines 8-12; also noting Applicant's own specification, page 10 lines 8-10, that describes a semiconductor substrate that may be comprised by a material with a bandgap less than 4 electron volts) and forming an indium doped dielectric layer, over a

waveguide layer which is over the semiconductor substrate, with an indium concentration of 5 mole percent indium oxide (See column 5 lines 10-40).

Osenbach et al. fails to explicitly teach wherein the indium doped dielectric layer is over at least a portion of an active region.

However, Kim, in columns 3-4 lines 10-30 and Figures 3A-3E, teaches wherein an optical device with a waveguide layer also contains an active region. The Examiner notes that it is well known within the art to use waveguide layers to confine an active layer in an opto-electronic device to produce light amplification.

It would have been obvious to one of ordinary skill in the art to modify Osenbach et al. by incorporating an active region beneath a waveguide layer, as taught by Kim, because the use of waveguide layers to confine active regions is well known within optical devices.

#### Claim 11

Incorporating all arguments of Claim 9 and noting that Osenbach et al. teaches forming an indium doped silicon dioxide layer (See column 5 lines 20-27)

#### Claim 12

Incorporating all arguments of Claim 9 and noting that Osenbach et al. teaches an indium doped oxide layer having a thickness of at least 300 nm to 1500 nm (column 5 lines 30-40)

3. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over 6,195,191 to Osenbach et al. in view of 6,200,826 to Kim in view of 6,051,884 Papadas.

Incorporating all arguments of Claim 9 and noting that Osenbach et al. and Kim fail to explicitly teach an indium doped dielectric layer used as an interlevel dielectric.

However, Papadas, in column 4 lines 1-6, teaches an indium doped oxide used as a interlevel dielectric (80). Furthermore, Papadas teaches that indium doped oxide acts as an insulator, thereby preventing accidental electrical connections. (See column 3 lines 25-30)

It would have been obvious to one of ordinary skill in the art to modify Osenbach et al. and Kim by incorporating an indium doped interlevel oxide layer, as taught by Papadas, to form an insulating layer between multiple metal levels.

4. Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over 6,195,191 to Osenbach et al. in view of 6,200,826 to Kim in view of Publication No. JP2001-195789.

Incorporating all arguments of Claim 9 and noting that Osenbach et al. and Kim fail to explicitly teach an indium doped dielectric layer using a PVD process employing a target that comprises silicon dioxide and indium.

However, JP2001-195789, in column 2 lines 10-20, teaches forming an indium doped oxide layer via a PVD process with a target comprised by silicon dioxide, indium and chalcogen treated zinc. Further, JP2001-195789 teaches that the indium doped silicon dioxide protective film is formed without cracks, thereby increasing production efficiency.

It would have been obvious to one of ordinary skill in the art to modify Osenbach et al. and Kim by incorporating a PVD process with a target comprised by silicon dioxide, indium and chalcogen treated zinc, as taught by JP2001-195789, to form an indium doped silicon dioxide protective film without cracks, and, thereby increase production efficiency.

5. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over 6,195,191 to Osenbach et al. in view of 6,200,826 to Kim in view of 5,397,920 to Tran.

Incorporating all arguments of Claim 9 and noting that Osenbach et al. and Kim fail to explicitly teach a pressure ranging from 4 to 8 mtorr, a radio frequency ranging

from 50 to 550 watts and a gas flow rate ranging from 10 to 35 sccm when forming an indium doped dielectric layer.

However, Tran, in column 6 lines 34-49 and column 7 lines 29-32 and lines 51-57, teaches forming an indium doped oxide layer via a pressure of 7 mtorr, a radio frequency of 300 watts and a gas flow rate of 30 sccm. Further, Tran teaches that these process limitations give a film deposition rate of 1 angstrom per second. (See column 7 lines 53-57) Furthermore, Tran's use of such processing conditions shows the formation of an oxide layer to be functional.

It would have been obvious to one of ordinary skill in the art to modify Osenbach et al. and Kim by incorporating a pressure of 7 mtorr, a radio frequency of 300 watts and a gas flow rate of 30 sccm to form an indium doped oxide, as taught by Tran, to form the above film at a deposition rate of 1 angstrom per second. Furthermore, Tran's use of such processing conditions shows the formation of an oxide layer to be functional.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David L. Hogans whose telephone number is (703) 305-3361. The examiner can normally be reached on M-F (7:30-4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on (703) 308-4940. The fax phone


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numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.

dh   
May 8, 2003

  
CARL WHITEHEAD, JR.  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800